DEPARTMENT OF COMMERCE

RADIO SERVICE BULLETIN

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CONTENTS.

	Page.
Abbreviations	1
New stations	2
Alterations and corrections	5
Miscellaneous:	
Licenses of amateur operators suspended	15
Alaskan stations reopened for summer season	15
Introduction of summer time in Great Britain and Ireland	15
Information from the Berne bureau	15
Land-line telegraph rates for traffic by Wilmington (Calif.) (KSK) station of the Radio Corporation of America	16
Miscellaneous—Continued.	
Transoceanic rates for traffic through stations of the Radio Corporation of America	16
Radio frequency indicator for broadcasting stations	16
Audio-frequency amplifier unit	17
Tests of radio receiving sets	17
Short radio waves transmitted in beamlike searchlight reduce interference	18
References to current radio periodical literature	19
Radio signals of standard frequency	22

ABBREVIATIONS.

The necessary corrections to the List of Radio Stations of the United States and to the International List of Radiotelegraph Stations, appearing in this bulletin under the heading "Alterations and corrections," are published after the stations affected in the following order:

Name =Name of station.
Loc =Geographical location. O=west longitude. N=north latitude. S=south latitude.
Call =Call letters assigned.
System =Radio system used and sparks per second.
Range =Normal range in nautical miles.
W. l. =Wave lengths assigned: Normal wave lengths in italics.
Service =Nature of service maintained.
PG=General public.
PR=Limited public.
RC=Radio compass station.
P=Private.
O=Government business exclusively.
Hours =Hours of operation:
N=Continuous service.
X=No regular hours.
m=a. m. (12 m=midday).
s=p. m. (12 s=midnight).
Rates =Ship or coast charges in cents: c.=cents. (The rates in the international list are given in francs and centimes.)
I. W. T. Co.=Independent Wireless Telegraph Co.
R. C. A. =Radio Corporation of America.
S. O. R. S. =Ship Owners' Radio Service.
C. w. =Continuous wave.
I. c. w. =Interrupted continuous wave.
V. t. =Vacuum tube.
FX =Fixed station.
U. S. L. =After operating company denotes that the change applies only to the List of Radio Stations of the United States.
Kc. =Kilocycles.

50572—23——1

NEW STATIONS.

Commercial land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Basco, P. I.	KZAB	600, 1200, *1500*, 1800, 2400.	PG	.....	Philippine Insular Government.
Hillsboro, Oreg.	KEK	.....	PG	.....	Federal Telegraph Co.
Madison, Wis.[2]	WHA	1290	FX	X	University of Wisconsin.

[1] Loc. (approximately) 0.121° 59′ 00″, N. 30° 27′ 30″; range, 800; system, R. C. A., 1000; hours, 8 a. m.–12 noon and 2–5.30 p. m., ship schedule first and last 10 minutes of each hour, subject to change; rates, ship service, 12 c. per word.
[2] Loc. (approximately) 0.89° 23′ 45″, N. 43° 04′ 30″; range, 200; system, composite, v. t. telegraph; rates, none.

Commercial ship stations, alphabetically by names of vessels.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Name of vessel.	Call signal.	Rates.	Service.	Hours.	Owner of vessel.	Station controlled by—
Alaska	KFIM	.....	.....	.....	.....	
Berkshire	KFIE	8	PG	.....	Merchants & Miners Transportation Co.	
Buford	KFII	.....	.....	.....	.....	
Caesar[1]	KFIA	8	PG	X	Coastwise S. S. & Barge Co.	I. W. T. Co.
Carolyn Frances[3]	KFHO	8	PG	X	Western Whaling & Trading Co.	R. C. A.
City of Benton Harbor	WDV	.....	PG	X	Graham & Morton Transportation Co.	Do.
City of Grand Rapids	KFIS	.....	PG	X	....do.....	Do.
City of St. Joseph	KFIT	.....	PG	X	....do.....	Do.
Francis E. Powell	KFIG	.....	PG	X	Bethlehem Shipbuilding Corp.	
Joseph D. Wood[3]	KFIH	8	PG	X	Wood Towing Co.	Owner of vessel.
Leviathan	WSN	8	PG	N	U. S. S. B.	
Tillicum	KFIN	.....	.....	.....	American Tug Boat Co.	

[1] Range, 300; system, Navy–R. C. A., 1000; w. l., 300, 600, 706.
[2] Range, 150; system, R. C. A., 1000; w. l., 300, 600, 706.
[3] Range, 150; system, Wireless Specialty Apparatus Co., 1000; w. l., 300, 600, 706.

Commercial land and ship stations, alphabetically by call signals.

[b=ship station; c=land station.]

Call signal.	Name.		Call signal.	Name.	
KEK	Hillsboro, Oreg.	c	KFIN	Tillicum	b
KFHO	Carolyn Frances	b	KFIS	City of Grand Rapids	b
KFIA	Caesar	b	KFIT	City of St. Joseph	b
KFIE	Berkshire	b	KZAB	Basco, P. I.	c
KFIG	Francis E. Powell	b	WDV	City of Benton Harbor	b
KFIH	Joseph D. Wood	b	WHA	Madison, Wis.	c
KFII	Buford	b	WSN	Leviathan	b
KFIM	Alaska	b			

Broadcasting stations, alphabetically by names of cities.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

City.	Call signal.	City.	Call signal.
Allentown, Pa.	WCBA	New York, N. Y.	WJY
Anderson, Ind.	WABC	Do.	WJZ
Bangor, Me.	WABI	Oskaloosa, Iowa.	KFHL
Dayton, Ohio	WABD	Platte, S. Dak.	KFIJ
Gladbrook, Iowa.	KFIK	Reading, Pa.	WBBD
Greeley, Colo.	KFJD	Sandusky, Ohio.	WABH
Greenville, Ohio.	WCBB	South Bend, Ind.	WABJ
Iola, Kans.	KFID	Spokane, Wash.	KFIO
Jacksonville, Fla.	WABG	St. Louis, Mo.	KFIB
Kearney, Nebr.	KFHP	Sterling, Ill.	WBBC
Lakeside, Colo.	KFKH	Washington, D. C.	WABE
Minneapolis, Minn.	KFEX	Yakima, Wash.	KFIQ
Mount Vernon, Ill.	WABF	Zion, Ill.	WCBD
Newark, Ohio.	WBBA		

Stations broadcasting market or weather reports, music, concerts, lectures, etc., alphabetically by call letters.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

Call signal.	Station operated and controlled by—	Location of station.	Power (watts).	Wave length.	Frequency (kilocycles).
KFEX	Augsburg Seminary	Minneapolis, Minn.	100	261	1150
KFHL	Penn College	Oskaloosa, Iowa.	10	227	1320
KFHP	Radio-Bug Products Co.	Kearney, Nebr.	10	248	1220
KFIB	Franklin W. Jenkins.	St. Louis, Mo., 5666 Vernon Avenue.	10	244	1230
KFID	Ross Arbuckle's Garage	Iola, Kans.	20	246	1220
KFIJ	Sidney I. Thoreau	Platte, S. Dak.	5	236	1270
KFIK	Gladbrook Electrical Co.	Gladbrook, Iowa.	20	234	1280
KFIO	North Central High School	Spokane, Wash.	50	252	1190
KFIQ	Yakima Valley Radio Broadcasting Association.	Yakima, Wash.	50	224	1340
KFJD	Weld County Printing & Publishing Co.	Greeley, Colo.	100	236	1270
KFKH	Denver Park & Amusement Co.	Lakeside, Colo.	10	226	1330
WABC	Fulwider-Grimes Battery Co	Anderson, Ind.	10	229	1310
WABD	Parker High School	Dayton, Ohio.	10	283	1060
WABE	Young Men's Christian Association	Washington, D. C.	50	283	1060
WABF	Mount Vernon Register-News Co.	Mount Vernon, Ill.	250	234	1280
WABG	Arnold Edwards Piano Co.	Jacksonville, Fla.	10	248	1210
WABH	Lake Shore Tire Co.	Sandusky, Ohio.	100	240	1250
WABI	Bangor Railway & Electric Co.	Bangor, Me.	50	240	1250
WABJ	The Radio Laboratories	South Bend, Ind.	10	240	1250
WBBA	Newark Radio Laboratories	Newark, Ohio.	20	240	1250
WBBC	Sterling Radio Equipment Co.	Sterling, Ill.	50	229	1310
WBBD	Barbey Battery Service	Reading, Pa.	50	234	1280
WCBA	Charles W. Heimbach	Allentown, Pa., 1015 Allen Street.	5	280	1070
WCBB	K & K Radio Supply Co. (Charles W. Katzenberger).	Greenville, Ohio.	100	240	1250
WCBD	Wilbur G. Voliva	Zion, Ill.			
WJY	Radio Corporation of America	New York, N. Y.	500	405	740
WJZ	....do	....do	500	455	660

Government land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Fort McArthur, Tex.[1]	WUCK	600, 1160	O		U. S. Army.
Fort McKinley, Oreg	WUCV		O		Do.
San Francisco, Calif	KDQC		O		Post Office Department.

[1] Range, 300; system, Lowenstein, 1000.

Government ship stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations published by the Berne bureau.]

Station.	Call signal.	Wave lengths.	Service.	Hours.	Station controlled by—
Boxer	NIQM		O		Bureau of Education, Department of Interior.

Government land and ship stations, alphabetically by call signals.

[b—ship station; c—land station.]

Call signal.	Name of station.	Call signal.	Name of station.
KDQC	San Francisco, Cal....c	WUCK	Fort McArthur, Tex....c
NIQM	Boxer....b	WUCV	Fort McKinley, Oreg....c

Special land stations, alphabetically by names of stations.

[Additions to the List of Radio Stations of the United States, edition of June 30, 1922.]

Station.	Call signal.	Wave lengths.	Station controlled by—
Baton Rouge, La	5YW	150–220	Louisiana State University.
Marion, Mass	1XAL	200, and 1277–1304	Irving Vermilya.
New York, N. Y. (510 West Twenty-third Street).	2XAX	360, 405	Ship Owners Radio Service.
Salt Lake City, Utah	6XBG	200–500	H. C. Wilson (Deseret News).
Waco, Tex	5YX	150–220	Baylor University.

Special land stations, grouped by districts.

Call signal.	District and station.	Call signal.	District and station.
1XAL	First district: Marion, Mass.		Fifth district—Continued.
2XAX	Second district: New York, N. Y.	5YX	Waco, Tex.
5YW	Fifth district: Baton Rouge, La.	6XBG	Sixth district: Salt Lake City, Utah.

ALTERATIONS AND CORRECTIONS.

COMMERCIAL LAND STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

BARNEGAT, N. J. (Tuckerton).—W. l., 300, *600*, 16700.
BAYTOWN, TEX.—W. l., 300, *600*, 706.
BOLINAS, CALIF. (KPH).—System, R. C. A., c. w., i. c. w., and spark, 1000.
CHEBOYGAN, MICH.—W. l., 300, *600*, 1599.
CLEVELAND, OHIO.—W. l., 300, *600*, 1817.
CORAM HILL, N. Y.—W. l., 17500.
DEARBORN, MICH.—W. l., 300, *600*, 1713.
EAST MORICHES, N. Y.—W. l., 300, *600*, 2500.
EAST PITTSBURGH, PA.—W. l., 1817.
EL DORADO, KANS.—W. l., 1599.
EVERETT, WASH.—Accounts for message charges should be forwarded to the American Tug Boat Co., in lieu of the S. O. R. S.
FALSE PASS, ALASKA.—W. l., 300, 525, *600*, 1650.
HILLSBORO, OREG.—W. l., 300, *600*, 4120, 6175, 8500.
LUDINGTON, MICH.—W. l., 300, 450, *600*, 1666. Limited commercial service with Manistique and Frankfort, Mich., Manitowoc and Milwaukee, Wis., on 1666 meters.
NORTHVILLE, MICH.—W. l., 300, *600*, 1713.
OAKLAND, CALIF.—W. l., 143.
OWENSBORO, KY.—W. l., 1790.
PALO, ALTO, CALIF.—W. l., 3554, 3900, 4300, 4785, 5720, 7587.
PRINCETON, IND.—W. l., 1790.
QUINCY, MASS.—W. l., 1966.
SAN FRANCISCO, CALIF. (portable) (KTA).—W. l., 143, 300, *600*.
SAN FRANCISCO, CALIF. (KUO).—W. l., 143, 300, *600*, 690.
SPRINGFIELD, MASS.—W. l., 1817.
ST. CROIX FALLS, WIS.—W. l., 1764.
Strike out all particulars of the following-named stations: Fort Worth, Tex.; San Diego, Calif.; and Savannah, Ga.

COMMERCIAL SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

ABNER COBURN.—W. l., 300, *600*.
ACROPOLIS.—Name changed to Washington; Nicholas P. Antoniades owner of vessel.
ADVANCE.—J. Abbott Nile owner of vessel; station operated and controlled by R. C. A.; rates, 8 cents per word.
A. E. R. SCHNEIDER.—W. l., 300, *600*, rates, Great Lakes service, 2 cents per word.
AFOUNDRIA.—Range, 300; system, Navy-Wireless Specialty Apparatus Co., 1000: W. l., 300, 450, *600*.
AGWIMARS.—W. l., 300, 450, *600*.
ALADDIN.—W. l., add 706.
ALAMEDA (KOBN).—Station operated and controlled by R. C. A.
ALL AMERICA.—W. l., add 706.
ALLEGHANY.—Range, 300; system, R. C. A., 1000; w. l., 300, 450, *600*, 706.
AMERICAN STAR.—System, Navy-R. C. A., 1000.
ANNETTA.—W. l., add 706.
ANTIETAM.—Station operated and controlled by R. C. A. (U. S. L.).
ARAPAHOE (KVB).—W. l., add 706.
ARCTIC.—Range, 300; system, R. C. A., 1000; w. l., 300, *600*, 1800.
ARGON.—W. l., add 706.
ARIZONAN.—W. l., add 706.
BALSAM.—W. l., add 706.
BARACOA.—System, Navy–R. C. A., 1000; w. l., add 706.
BELVIDERE.—W. l., 300, 450, *600*, 706.
BETHORE.—Guaranty Trust Co., owner of vessel.
BOGOTA.—W. l., 300, 450, *600*, 706.
BOHEMIAN CLUB.—Station operated and controlled by R. C. A.
BOLIVAR.—Colombian S. S. Co., owner of vessel; w. l., add 706.
BRADFORD.—Name changed to Alden Anderson.
BRIDGETOWN.—System, Navy–R. C. A., 1000; w. l., add 706.

BROOKDALE.—System, Navy, 1000; station operated and controlled by S. O. R. S. (U. S. L.); rates, North and South American service, 4 cents per word.
BUTTERFIELD.—W. l., 300, 450, *600*, 706.
CACIQUE.—W. l., add 706.
CANIBAS.—Station operated and controlled by R. C. A. (U. S. L.).
CARACAS.—W. l., add 706.
CARRABULLE.—W. l., add 706.
CASSIMIR.—Range, 300; system, Navy–R. C. A., 1000; w. l., 300, 450, *600*, 706; Curtis Bay Copper & Iron Works owner of vessel.
CASTLE POINT.—System, Navy–R. C. A., 1000; w. l., 300, 450, *600*, 706; Charles R. McCormick S. S. Co. owner of vessel; station operated and controlled by I. W. T. Co. (U. S. L.).
CATAHOULA.—W. l., add 706.
CENTAURUS.—System, R. C. A., 1000; w. l., 300, 450, *600*, 706; Planet S. S. Cop. owner of vessel.
CHARLES M. EVEREST.—W. l., add 706.
CHARLES R. MCCORMICK.—System, Navy, 1000; w. l., 300, 450, *600*.
CHESTER VALLEY.—System, Navy–Wireless Specialty Apparatus Co., 1000.
CHICKASAW.—System, Navy–Wireless Specialty Apparatus Co., 1000.
CHILKAT.—Range, 150; system, R. C. A., 1000; w. l., 300, *600*; station operated and controlled by owner of vessel; rates, 8 cents per word.
CITY OF ST. JOSEPH.—W. l., add 706.
CITY OF ST. LOUIS.—W. l., add 706.
CHINA.—System, R. C. A., 1000.
CHINCHA.—Planet S. S. Corp. owner of vessel.
CITY OF ALAMEDA.—Name changed to W. F. Burdell; Pure Oil S. S. Co. owner of vessel.
COLLAMER.—W. l., add 706.
COMANCHE.—W. l., add 706.
COMET.—Range, 300; w. l., add 706; Standard Transportation Co. owner of vessel.
CONEHATTA.—W. l., add 706.
CORVUS.—W. l., add 706.
CRETAN.—W. l., add 706.
CROSS KEYS.—System, Navy–R. C. A., 1000; w. l., 300, 450, *600:* station operated and controlled by I. W. T. Co. (U. S. L.).
CUPRUM.—Range, 300; system, Federal arc; w. l., 300, *600*, 1800.
DERBYLINE.—Texas Co. owner of vessel.
DEROCHE.—System, Navy–Lowenstein, 1000; w. l., 300, 450, *600:* station operated and controlled by R. C. A.
DE SOTA.—Correct orthography De Soto.
D. F. MCALLISTER.—Station operated and controlled by I. W. T. Co.
DILLWYN.—System, Navy-R. C. A., 1000; w. l., add 706; Malston Co., owner of vessel; station operated and controlled by I. W. T. Co.
DOCHRA.—W. l., add 706.
DOROTHY LUCKENBACH.—W. l., 300, 450, *600*, 706.
DUNGANNON.—Texas Co., owner of vessel.
EASTERN TEMPEST.—W. l., add 706.
EDWARD PIERCE.—Correct orthography Edward Peirce.
EGLANTINE.—W. l., add 706.
EL CAPITAN (KKH).—W. l., add 706.
ELLENOR.—W. l., add 706.
EL SOL.—W. l., add 706.
ENSLEY CITY.—W. l., add 706.
ESPERANZA.—W. l., add 706.
F. Q. BARSTOW.—System, R. C. A., 1000.
FREDERIC R. KELLOGG.—System, R. C. A., 1000.
GARFIELD.—W. l., add 706.
GENERAL O. H. ERNST.—W. l., add 706.
GENERAL W. C. GORGAS.—W. l., add 706.
GEORGE L. OLSON.—Range, 200; system, Gray & Danielson, 240; w. l., 300, *600:* station operated and controlled by owner of vessel; rates, 8 c. per word.
GEORGE WASHINGTON.—W. l., add 706.
GLEN RIDGE.—W. l., add 706.
GLOUCESTER.—W. l., add 706.
GRIFFDU.—W. l., 300, 450, *600*.
HADNOT.—Steamer Freeport Corp., owner of vessel.

HAGOOD.—W. l., 300, 450, *600;* Cities Service Co., owner of vessel; station operated and controlled by R. C. A.
HAHATONKA.—Gulf Refining Co., owner of vessel.
HAITI.—W. l., add 706.
HALWAY.—Gulf Refining Co., owner of vessel.
HAMMAC.—General Petroleum Corp., owner of vessel.
HAMPTON ROADS.—Range, 300; system, Federal arc, 1000 with chopper; w. l., 300, *600*, 1800; station operated and controlled by S. O. R. S. (U. S. L.).
HARRY LUCKENBACH.—W. l., 300, 450, *600*, 706; hours, X.
HAWAIIAN.—W. l., add 706.
HENRY R. MALIORY.—W. l., add 706.
HENRY S. GROVE.—W. l., add 706.
HOWARD.—W. l., add 706.
HOXIE.—System, Navy-R. C. A., 1000; w. l., 300, 450, *600*, 706.
HUGOTON.—System, Navy-R. C. A., 1000; w. l., 300, 450, *600*, 706; Malston Co., owner of vessel; station operated and controlled by I. W. T. Co.
HURON (KVH).—W. l., add 706.
IROQUOIS (KVF).—W. l., add 706.
J. A. BOSTWICK.—System, R. C. A., 1000.
J. A. MOFFETT.—System, R. C. A., 1000.
J. L. LUCKENBACH.—W. l., 300, 450, *600*, 706; hours, X.
JONANCY.—System, Navy-R. C. A., 1000.
JUNEAU.—Name changed to Back Bay.
JUNIATA (K-q-J).—W. l., add 706.
JULIA LUCKENBACH.—W. l., add 706.
KERMIT.—American Ship & Commerce Navigation Corp., owner of vessel.
KISHACOQUILLAS.—System, Navy-Wireless Specialty Apparatus Co., 1000; w. l., 300, 450, *600*, 706.
LAKE ELSMERE.—Name changed to City of Philadelphia; Southern S. S. Co., owner of vessel.
LAKE FANNIN.—System, Navy-R. C. A., 1000; Clyde S. S. Co., owner of vessel.
LAKE FERNWOOD.—Richmond-New York S. S. Co., owner of vessel.
LAKE FRANCES.—Frank Paramino, owner of vessel; station operated and controlled by I. W. T. Co.
LAKE GILBOA.—Name changed to Oneida; system, Navy-R. C. A., 1000; Clyde S. S. Co., owner of vessel.
LAKE PEPIN.—Name changed to Samoa.
LAKE STRYMON.—Name changed to City of Houston; Southern S. S. Co., owner of vessel.
LATOUCHE.—Range, 200.
LENAPE.—W. l., add 706.
LEVISA.—W. l., 300, 450, *600*, 706.
LEWIS LUCKENBACH.—W. l., add 706.
L. J. DRAKE.—System, R. C. A., 1000; w. l., 300, 450, *600*.
MADISON.—W. l., add 706.
MAGUNKOOK.—System, Navy-Wireless Specialty Apparatus Co., 1000; hours, X; Moore Drydock Co., owner of vessel; station operated and controlled by I. W. T. Co.
MAJOR WHEELER.—W. l., add 706.
MANGORE.—W. l., add 706.
MARGARET DOLLAR.—W. l., add 706.
MARINA.—System, R. C. A., 1000; hours X.
MARQUETTE & BESSEMER No. 2.—W. l., 300, *600*.
MARTINIQUE.—Colombian S. S. Co., owner of vessel.
MENOMINEE.—Station operated and controlled by R. C. A.
METON.—Range, 300; system, Federal arc; w. l., 300, 450, *600*, 1800.
MEXICO.—W. l., add 706.
MINNEKAHDA.—W. l., add 706.
MISKIANZA.—Station operated and controlled by I. W. T. Co.
MOBILE CITY.—W. l., add 706.
MOHAWK (KVM).—W. l., add 706.
MONGOLIA.—W. l., add 706.
MOUNT BAKER.—Red Salmon Canning Co., owner of vessel.
MOUNT CARROLL.—W. l., add 706.
MOUNT CLAY.—W. l., add 706.
MUNAIRES.—W. l., add 706.
MUNALBRO.—W. l., add 706.
MUNARGO.—W. l., add 706.

MUNRIO.—System, Cutting & Washington, 1000; w. l., 300, 450, *600*, 706; station operated and controlled by I. W. T. Co.
NANTUCKET.—W. l., add 706.
NOMA.—8 c. per word.
NORMAN BRIDGE.—System, R. C. A., 1000.
NUSHAGAK.—Range, 150; system, R. C. A., 1000.
OLEN.—W. l., add 706.
ONTARIO.—W. l., add 706.
PAN-AMERICA.—W. l., add 706.
PARAGUAY.—Sun Oil Co., owner of vessel.
PATRICK HENRY.—Station operated and controlled by I. W. T. Co.
PEARLDON.—Atlantic Refining Co., owner of vessel.
PENNSYLVANIA.—W. l., add 706.
PENOBSCOT.—W. l., add 706.
PERSIAN.—W. l., add 706.
PHILADELPHIA (KSM).—W. l., add 706.
PHYLLIS.—Range, 150; system, R. C. A., 1000; w. l., 300, *600;* rates, 8 c. per word.
PLYMOUTH (KND).—Range, 150; system, R. C. A., 1000; w. l., 300, *600;* Plymouth S. S. Co. owner of vessel.
PONCE.—W. l., add 706.
PORTO RICO.—W. l., add 706.
PRESIDENT FILLMORE.—System, Federal arc and Navy-R. C. A., spark, 1000; w. l., 300, 450, *600*, 706.
PRESIDENT HARDING.—System, Navy-R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by S. O. R. S.
PRESIDENT MONROE.—W. l., add 706.
PRESIDENT POLK.—W. l., add 706.
PRESIDENT ROOSEVELT.—W. l., add 706.
PRESIDENT VAN BUREN.—W. l., add 706.
PUGET SOUND.—W. l., 300, 450, *600*, 706.
RANSOM B. FULLER.—W. l., add 706.
RESTLESS.—A. S. Cochrane owner of vessel.
RICHCONCAL.—W. l., 300, 450, *600*, 706.
ROBIN GRAY.—W. l., 300, 450, *600*.
ROBIN HOOD.—W. l., add 706.
ROOSEVELT.—Range, 150; system, Navy-Kilbourne & Clark, 1000; w. l., 300, 450, *600;* service, PG; hours, X; station operated and controlled by owner of vessel; rates, 6 c. per word.
SAN JACINTO.—W. l., add 706.
SAN JUAN (KULV).—Station operated and controlled by owner of vessel.
SAN LORENZO.—W. l., add 706.
SANTA ANA (WAL).—Santa Ana S. S. Co. owner of vessel.
SANTA ANA (WBX).—W. l., add 706.
SANTA LUISA.—System, R. C. A., 1000.
SANTA CECILIA.—W. l., add 706.
SANTA CLARA.—W. l., add 706.
SANTA ISABEL.—W. l., add 706.
SANTA PAULA.—W. l., add 706.
SANTA ROSA.—W. l., add 706.
SANTA TERESA.—W. l., add 706.
SAUGUS.—W. l., add 706.
SCHODACK.—W. l., add 706; station operated and controlled by I. W. T. Co. (U. S. L.).
SEA MONARCH.—System, R. C. A., 1000; rates, 8 c. per word.
SELMA CITY.—System, R. C. A., 1000.
SIBONEY.—W. l., add 706.
SIERRA.—S. S. Freeman owner of vessel.
SIXAOLA.—W. l., add 706.
S. M. SPALDING.—System, R. C. A., 1000.
S. O. Co. No. 93.—System, R. C. A., 240.
SOCONY.—System, R. C. A., 1000.
SOCONY 82.—System, R. C. A., 1000.
SOCONY 84.—W. l., 300, 450, *600*.
SOCONY 89.—System, R. C. A., 1000.
SOCONY 90.—System, R. C. A., 1000.
SOCONY 92.—System, R. C. A., 1000.
SOUTHERN CROSS.—W. l., add 706.
SPRAY (KDYB).—Service, PG; rates, 8 c. per word.

STANLEY DOLLAR.—System, R. C. A., 1000; w. l., 300, 450, *600;* hours, X; rates, station operated and controlled by I. W. T. Co.
STAR OF FRANCE.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
STAR OF ITALY.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
STAR OF SCOTLAND.—Range, 150; system, R. C. A., 1000; w. l., 300, 450, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
STEEL SEAFARER.—W. l., add 706.
STEPHEN R. JONES.—W. l., add 706.
ST. KATHERINE.—Range, 200; system, Halcun, 240; w. l., 300, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
SUDBURY.—W. l., add 706.
SURINAME.—System, composite, 1000; w. l., add 706.
SUSQUEHANNA (KOLN).—W. l., add 706.
SUSQUEHANNA (WEM).—System, R. C. A., 1000.
TANAMO.—W. l., add 706.
THOMAS P. BEAL.—W. l., add 706.
TIVIVES.—W. l., 300, 450, *600*, 706.
TURRIALBA.—W. l., add 706.
TUSCALOOSA CITY.—W. l., add 706.
TUSTEM.—Station operated and controlled by R. C. A.
UTACARBON.—System, Navy-R. C. A., 1000.
VACOIL.—Range, 300; system, R. C. A., 1000; w. l., add 706; rates, 8 c. per word.
VACUUM.—W. l., add 706.
VITTORIO EMMANUELE III.—System, Navy-Kilbourne & Clark, 1000; w. l., 300, 450, *600*.
WAIMEA.—Los Angeles S. S. Co. owner of vessel.
WALLINGFORD.—Station operated and controlled by I. W. T. Co.
WALTER A. LUCKENBACH.—W. l., add 706; hours, X.
WARWICK.—W. l., 300, *600*, 1800; station operated and controlled by R. C. A.
W. E. HUTTON.—System, Navy-R. C. A., 1000.
WEST CACTUS.—System, Navy-Liberty, 1000.
WEST CAWTHON.—W. l., add 706.
WEST CELINA.—W. l., add 706.
WEST INSKIP.—W. l., add 706.
WEST ISLETA.—W. l., add 706.
WESTLAKE.—W. l., 300, 450, *600*, 706.
WEST NIGER.—W. l., 300, 450, 600.
WEST NOSSKA.—W. l., add 706.
WEST SEQUANA.—W. l., add 706; station operated and controlled by I. W. T. Co. (U. S. L.).
W. F. BURROWS.—Station operated and controlled by owner of vessel.
WHITNEY OLSEN.—Range, 200; system, Gray & Danielson, 240; w. l., 300, *600;* station operated and controlled by owner of vessel; rates, 8 c. per word.
WILLIAM A. MCKENNEY.—W. l., 300, 450, *600*.
WILLPOLO.—W. l., add 706.
WINONA.—W. l., add 706.
W. L. STEED.—Pan American Petroleum & Transport Co. owner of vessel.
WYTHEVILLE.—W. l., add 706.
YUMA.—W. l., add 706.
ZULIA.—W. l., add 706.
Strike out particulars of the following-named vessels: Admiral Mayo, Brush, Castle Lodge, Danville, Dewey (KDNF), Lake Gebhart, Moldegaard, Seaconnet, and Silverado.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

KDRI, *read* Washington; KEZJ, *read* Oneida; KFFT *read* De Soto; KMOU, *read* Edward Peirce; KNG, *read* Alden Anderson; KONS, *read* City of Houston; KONT, *read* City of Philadelphia; KTUI, *read* Samoa; KUCQ, *read* W. F. Burdell; WAM, *read* Back Bay; strike out all particulars following the call signals, KDHV, KDNF, KEN, KFBP, KGV, KJOU, KOGV, KOSJ, WBAL, WCV, WRC, and WZIO.

COMMERCIAL AIRPLANE STATIONS, ALPHABETICALLY BY NAMES.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

Strike out all particulars of the following-named airplanes: Gov. Cordeaux (KFHF), Nina (KFBJ), Ponce de Leon (KFBM), and Santa Maria (KFBZ).

BROADCASTING STATIONS, BY CALL SIGNALS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922.]

NOTE.—The frequency for 360 meters is 833 kc.

KDKA (East Pittsburgh, Pa.).—W. l., 326; frequency, kc. 920.
KDPM (Cleveland, Ohio).—W. l., 270; frequency, kc. 1110.
KDYL (Salt Lake City, Utah).—W. l., 360 only.
KDYM (San Diego, Calif.).—W. l., 252; frequency, kc. 1190.
KDZF (Los Angeles, Calif.).—W. l., 278; frequency, kc. 1080.
KDZR (Bellingham, Wash.).—W. l., 261; frequency, kc. 1150.
KFAT (Eugene, Oreg.).—W. l., 275; frequency, kc. 1090.
KFAU (Boise, Idaho).—W. l., 270; frequency, kc. 1110.
KFAV (Venice, Calif.).—W. l., 258; frequency, kc. 1160.
KFBK (Sacramento, Calif.).—W. l., 360 only.
KFBL (Everett, Wash.).—W. l., 224; frequency, kc. 1340.
KFCL (San Antonio, Calif.).—W. l., 360 only.
KFDC (Spokane, Wash.).—W. l., 283; frequency, kc. 1060.
KFDO (Bozeman, Mont.).—W. l., 248; frequency, kc. 1210.
KFDP (Des Moines, Iowa).—W. l., 278; frequency, kc. 1080.
KFDU (Lincoln, Nebr.).—W. l., 240; frequency, kc. 1250.
KFEC (Portland, Oreg.).—W. l., 360 only.
KFEP (Denver, Colo.).—W. l., 240; frequency, kc. 1250.
KFER (Fort Dodge, Iowa).—W. l., 231; frequency, kc. 1300.
KFEV (Douglas, Wyo.).—W. l., 263; frequency, kc. 1140.
KFFA (San Diego, Calif.).—W. l., 242; frequency, kc. 1240.
KFFP (Moberly, Mo.).—W. l., 275; frequency, kc. 1090.
KFFQ (Colorado Springs, Colo.).—W. l., 360 only.
KFGL (Arlington, Oreg.).—W. l., 234; frequency, kc. 1280.
KFHB (Hood River, Oreg.).—W. l., 280; frequency, kc. 1070.
KFHH (Neah Bay, Wash.).—W. l., 283; frequency, kc. 1060.
KFHR (Seattle, Wash.).—W. l., 270; frequency, kc. 1110.
KFI (Los Angeles, Calif.).—W. l., 469; frequency, kc. 640.
KFZ (Spokane, Wash.).—W. l., 283; frequency, kc. 1060.
KGW (Portland, Oreg.).—W. l., 492; frequency, kc. 610.
KGY (Lacey, Wash.).—W. l., 258; frequency, kc. 1160.
KHJ (Los Angeles, Calif.).—W. l., 395; frequency, kc. 760.
KJR (Seattle, Wash.).—W. l., 270; frequency, kc. 1110.
KNT (Aberdeen, Wash.).—W. l., 263; frequency, kc. 1140.
KOP (Detroit, Mich.).—W. l., 286; frequency, kc. 1050.
KPO (San Francisco, Calif.).—W. l., 423; frequency, kc. 710.
KSD (St. Louis, Mo.).—W. l., 546; frequency, kc. 550.
KUO (San Francisco, Calif.).—W. l., 360 only.
KWH (Los Angeles, Calif.).—W. l., 360 only.
KYW (Chicago, Ill.).—W. l., 345; frequency, kc. 870.
WAAB (New Orleans, La.).—W. l., 268; frequency, kc. 1120.
WAAK (Milwaukee, Wis.).—W. l., 280; frequency, kc. 1070.
WAAM (Newark, N. J.).—W. l., 263; frequency, kc. 1140.
WBAN (Paterson, N. J.).—W. l., 244; frequency, kc. 1230.
WBAP (Fort Worth, Tex.).—W. l., 476; frequency, kc. 630.
WBAU (Hamilton, Ohio).—W. l., 258; frequency, kc. 1160.
WBAV (Columbus, Ohio).—W. l., 390; frequency, kc. 770.
WBAW (Marietta, Ohio).—W. l., 246; frequency, kc. 1220.
WBAY (New York, N. Y.).—W. l., 492; frequency, kc. 610.
WBL (Anthony, Kans.).—W. l., 261; frequency, kc. 1150.
WBU (Chicago, Ill.).—W. l., 286; frequency, kc. 1050.
WBZ (Springfield, Mass.).—W. l., 337; frequency, kc. 890.
WCAE (Pittsburgh, Pa.).—W. l., 462; frequency, kc. 650.
WCAH (Columbus, Ohio).—W. l., 286; frequency, kc. 1050.

WCAT (Rapid City, S. Dak.).—W. l., 240; frequency, kc. 1250.
WCAU (Philadelphia, Pa.).—W. l., 286; frequency, kc. 1050.
WCAY (Milwaukee, Wis.).—W. l., 261; frequency, kc. 1150.
WCX (Detroit, Mich.).—W. l., 517; frequency, kc. 580.
WDAF (Kansas City, Mo.).—W. l., 411; frequency, kc. 730.
WDAK (Hartford, Conn.).—W. l., 261; frequency, kc. 1150.
WDAR (Philadelphia, Pa.).—W. l., 395; frequency, kc. 760.
WDAY (Fargo, N. Dak.).—W. l., 244; frequency, kc. 1230.
WDZ (Tuscola, Ill.).—W. l., 278; frequency, kc. 1080.
WEAB (Fort Dodge, Iowa).—W. l., 360 only.
WEAD (Atwood, Kans.).—W. l., 268; frequency, kc. 1120; station operated and controlled by Henry Radio & Electrical Supply.
WEAF (New York, N. Y.).—W. l., 492; frequency, kc. 610.
WEAG (Edgewood, R. I.).—W. l., 231; frequency, kc. 1300.
WEAI (Ithaca, N. Y.).—W. l., 286; frequency, kc. 1050.
WEAM (North Plainfield, N. J.).—W. l., 250; frequency, kc. 1190.
WFAA (Dallas, Tex.).—W. l., 476; frequency, kc. 630.
WFAB (Syracuse, N. Y.).—W. l., 234; frequency, kc. 1280.
WFI (Philadelphia, Pa.).—W. l., 395; frequency, kc. 760.
WGAL (Lancaster, Pa.).—W. l., 248; frequency, kc. 1210.
WGAU (Wooster, Ohio).—W. l., 226; frequency, kc. 1330; station operated and controlled by Radio Manufacturing & Service Co. (Marcus G. Limb).
WGAW (Altoona, Pa.).—W. l., 261; frequency, kc. 1150.
WGF (Des Moines, Iowa).—W. l., 360 only.
WGY (Schenectady, N. Y.).—W. l., 380; frequency, kc. 790.
WHAA (Iowa City, Iowa).—W. l., 283; frequency, kc. 1060.
WHAG (Cincinnati, Ohio).—W. l., 222; frequency, kc. 1350.
WHAL (Lansing, Mich.,)—W. l., 248; frequency, kc. 1210.
WHAS (Louisville, Ky.).—W. l., 400; frequency, kc. 750.
WHAZ (Troy, N. Y.).—W. l., 380; frequency, kc. 790.
WHB (Kansas City, Mo.).—W. l., 411; frequency, kc. 730.
WHN (Ridgewood, N. Y.).—W. l., 360 only.
WIAD (Ocean City, N. J.).—W. l., 254; frequency, kc. 1180.
WIAF (New Orleans, La.).—W. l., 234; frequency, kc. 1280.
WIAI (Springfield, Mo.).—W. l., 360 only.
WIAJ (Neenah, Wis.).—W. l., 224; frequency, kc. 1340.
WIAK (Omaha, Nebr.).—W. l., 278; frequency, kc. 1080.
WIP (Philadelphia, Pa.).—W. l., 509; frequency, kc. 590.
WJAK (Stockdale, Ohio).—W. l., 360 only.
WJAN (Peoria, Ill.).—W. l., 280; frequency, kc. 1070.
WJAX (Cleveland, Ohio).—W. l., 390; frequency, kc. 770.
WJAZ (Chicago, Ill.).—W. l., 448; frequency, kc. 670.
WJD (Granville, Ohio).—W. l., 229; frequency, kc. 1310.
WJH (Washington, D. C.).—W. l., 263; frequency, kc. 1140.
WKAC (Lincoln, Nebr.).—W. l., 275; frequency, kc. 1090.
WKAN (Montgomery, Ala.).—W. l., 226; frequency, kc. 1330; station operated and controlled by United Battery Service Co.
WKAW (Beloit, Wis.).—W. l., 242; frequency, kc. 1240.
WKAX (Bridgeport, Conn.).—W. l., 231; frequency, kc. 1300.
WLAG (Minneapolis, Minn.).—W. l., 417; frequency, kc. 720.
WLAH (Syracuse, N. Y.).—W. l., 234; frequency, kc. 1280.
WLAS (Hutchinson, Kans.).—W. l., 244; frequency, kc. 1230.
WLAX (Greencastle, Ind.).—W. l., 231; frequency, kc. 1300.
WLAZ (Warren, Ohio).—W. l., 248; frequency, kc. 1210.
WMAC (Cazenovia, N. Y.).—W. l., 261; frequency, kc. 1150.
WMAH (Lincoln, Nebr.).—W. l., 254, frequency, kc. 1180.
WMAJ (Kansas City, Mo.).—W. l., 275; frequency, kc. 1090.
WMAL (Trenton, N. J.).—W. l., 256; frequency, kc. 1170.
WMAP (Easton, Pa.).—W. l., 246; frequency, kc. 1220.
WMAQ (Chicago, Ill.).—W. l., 448; frequency, kc. 670.
WMAV (Auburn, Ala.).—W. l., 250; frequency, kc. 1200.
WMAZ (Macon, Ga.).—W. l., 268; frequency, kc. 1120.
WMC (Memphis, Tenn.).—W. l., 500, frequency, kc. 600.
WMH (Cincinnati, Ohio).—W. l., 248; frequency, kc. 1210.
WMU (Washington, D. C.).—W. l., 261, frequency, kc. 1150.
WNAD (Norman, Okla.).—Station operated and controlled by University of Oklahoma.

WNAN (Syracuse, N. Y.).—W. l., 286; frequency, kc. 1050.
WNAX (Yankton, S. Dak.).—W. l., 244; frequency, kc. 1230.
WOAC (Lima, Ohio).—W. l., 266; frequency, kc. 1130.
WOAG (Belvidere, Ill.).—W. l., 224; frequency, kc. 1340.
WOAI (San Antonio, Tex.).—W. l., 385; frequency, kc. 780.
WOAV (Erie, Pa.).—W. l., 242; frequency, kc. 1240.
WOAW (Omaha, Nebr.).—W. l., 526; frequency, kc. 570.
WOAX (Trenton, N. J.).—W. l., 240; frequency, kc. 1250.
WOC (Davenport, Iowa).—W. l., 484; frequency, kc. 620.
WOO (Philadelphia, Pa.).—W. l., 509; frequency, kc. 590.
WOQ (Kansas City, Mo.).—W. l., 360 only.
WOR (Newark, N. J.).—W. l., 405; frequency, kc. 740.
WPAH (Waupaca, Wis.).—W. l., 360 only.
WPAJ (New Haven, Conn.).—W. l., 268; frequency, kc. 1120.
WPAL (Columbus, Ohio).—W. l., 286; frequency, kc. 1050.
WPAZ (Charleston, W. Va.).—W. l., 273; frequency, kc. 1100.
WQAD (Waterbury, Conn.).—W. l., 242; frequency, kc. 1240.
WQAF (Sandusky, Ohio).—W. l., 240; frequency, kc. 1250.
WQAH (Lexington, Ky.).—W. l., 254, frequency, kc. 1180.
WQAQ (Abilene, Tex.).—Station operated and controlled by Abilene Daily Reporter (West Texas Radio Co.).
WQAS (Lowell, Mass.).—W. l., 266, frequency, kc. 1130.
WRAL (St. Croix Falls, Wis.).—W. l., 248, frequency, kc. 1210.
WRAN (Waterloo, Iowa).—W. l., 229, frequency, kc. 1310.
WRAR (David City, Nebr.).—W. l., 226, frequency, kc. 1330.
WRW (Tarrytown, N. Y.).—W. l., 273, frequency, kc. 1100.
WSAH (Chicago, Ill.).—W. l., 248, frequency, kc. 1210.
WSAI (Cincinnati, Ohio).—W. l., 309, frequency, kc. 970.
WSAL (Brookville, Ind.).—W. l., 246, frequency, kc. 1220.
WSB (Atlanta, Ga.).—W. l., 429, frequency, kc. 700.
WSL (Utica, N. Y.).—W. l., 273, frequency, kc. 1100.
WTAS (Elgin, Ill. near).—W. l., 275, frequency, kc. 1090; station operated and controlled by Charles E. Erbstein.
WTAW (College Station, Tex.).—W. l., 254, frequency, kc. 1180.
WWI (Dearborn, Mich.).—W. l., 273, frequency, kc. 1100.
WWJ (Detroit, Mich.).—W. l., 517, frequency, kc. 580.
Strike out all particulars of the following-named stations: KDN, San Francisco, Calif.; KDZH, Fresno, Calif.; KFAZ, Reedley, Calif.; KFCQ, Casper, Wyo.; KFGF, Mount Vernon, Wash.; KFGM, Abilene, Tex.; KFHC, Norman, Okla.; KFV, Yakima, Wash.; KLB, Pasadena, Calif.; KQY, Portland, Oreg.; KYI, Bakersfield, Calif.; KYJ, Los Angeles, Calif.; WAAJ, Boston, Mass.; WAAQ, Greenwich, Conn.; WAAS, Decatur, Ga.; WDAC, Springfield, Ill.; WEAT, Tampa, Fla.; WFAU, Boston, Mass.; WGAD, Ensenada, P. R.; WGAH, New Haven, Conn.; WGAJ, Shenandoah, Iowa; WHAR, Atlantic City, N. J.; WJZ, Newark, N. J.; WPA, Fort Worth, Tex.; WPM, Washington, D. C.; and WWAJ, Columbus, Ohio.

GOVERNMENT LAND STATIONS, ALPHABETICALLY BY NAMES OF STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

EAGLE HARBOR, MICH. (R. C. station).—Loc. (approximately) 0.88° 08′ 45″, N. 47° 27′ 49″.
FORT STEVENS, OREG. (NPE).—Call signal changed to NZS.
HILO, HAWAII.—Loc. (approximately) 0.155° 03′ 09″, N. 19° 44′ 03″.
MOBILE, ALA.—Hours, 7 a.m.–7 p. m.
OCEAN PARK, WASH.—Call signal changed to NZS.
OFU, SAMOA.—Loc. (approximately) 0.169° 40′ 50″, N. 14° 11′ 30″ S.; rates, ship service, 12 c. per word.
POINT ISABEL, TEX.—Service, O.
ST. AUGUSTINE, FLA.—Hours, 8 a. m.–11 p. m.
TAU, SAMOA.—Loc. (approximately) 0.169° 33′ 15″, N. 14° 15′ 00″ S.; rates, ship service, 12 c. per word.
Strike out all particulars of the following-named stations: Cincinnati, Ohio; Eagle Harbor, Mich. (regular station); and Wrangell, Alaska.

GOVERNMENT SHIP STATIONS, ALPHABETICALLY BY NAMES OF VESSELS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922, and to the International List of Radiotelegraph Stations, published by the Berne bureau.]

Strike out all particulars of the following-named vessels: Army Tanker No. 1; Captain A. M. Wetherill; Captain Edwin C. Long; Capt. Samuel C. Cardwell; Captain T. M. Morrison; Col. Garland N. Whistler; Col. John V. White; Cyrus W. Field; Colonel Albert Todd; General Edmund Kirby; General George H. Weeks; General Harvey Brown; General Henry J. Hunt; General Henry Knox; General John P. Story; General R. B. Ayres; General Robert W. Swartwout; General S. B. Holabird; General Wallace F. Randolph; Henry Wilson; Lieut. Geo. M. Harris; Lieut. Harold G. Douglas, Liscum; Major Guy Howard; Major Lester E. Moreton; Major Samuel Ringgold; and Poe.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY BY CALL SIGNALS.

NPE, *read* NZS; strike out all particulars following the call signals, KDQC, NUG, WVJ, WXE, WXN, WYAC, WYAD, WYAE, WYAK, WYAL, WYAR, WYAT, WYAU, WYAV, WYAZ, WYBC, WYBF, WYBG, WYBH, WYBI, WYBJ, WYBK, WYBL, WYBM, WYBO, WYBQ, WYBU, WZS, WZT, and WZY.

SPECIAL LAND STATIONS, BY NAMES OF STATIONS.

[Alterations and corrections to be made to the List of Radio Stations of the United States, edition of June 30, 1922.]

ABILENE, TEX. (5YN).—W. l., 150–220.
AGRICULTURE COLLEGE, N. DAK. (9YG).—W. l., 150–220.
AMES, IOWA (9YI).—W. l., 150–220.
APPLETON, WIS. (9YAR).—W. l., 150–220.
AUBURN, ALA. (5XA).—W. l., 190–220.
BALTIMORE, MD. (3YH).—W. l., 150–220.
BLOOMINGTON, IND. (9YAG).—W. l., 150–220.
BOISE, IDAHO (7YA).—W. l., 150–220.
BUFFALO, N. Y. (8YP).—W. l., 150–220.
BUTTE, MONT. (7XM).—W. l., 600–1600.
CAMBRIDGE, MASS. (1XJ).—W. l., 200–1500.
CAMBRIDGE, MASS. (1XM).—W. l., 50–600.
CAPE GIRADEAU, MO. (9YAQ).—W. l., 150–220.
CHICAGO, ILL. (PORTABLE) (9XB).—W. l., 81.
CHICAGO, ILL. (9XN).—W. l., 30–1000.
CINCINNATI, OHIO (8YX).—W. l., 150–220.
COLORADO SPRINGS, COLO. (9XC).—W. l., 440.
CHICAGO, ILL. (9YL).—W. l., 150–220.
CLEVELAND, OHIO (8YL).—W. l., 150–220.
COLLEGE STATION, TEX. (5XB).—W. l., 200–1000.
COLUMBIA, MO. (9YM).—W. l., 150–220.
CONNELLSVILLE, PA. (8XAP).—W. l., 1000, 1300, 1600.
CONNELLSVILLE, PA. (PORTABLE) (8XAQ).—W. l., 150, 175, 200.
CONWAY, ARK. (5XAC).—W. l., 75–1000.
CORVALLIS, OREG. (7XH).—W. l., 175–2000.
CORVALLIS, OREG. (7YJ).—W. l., 150–220.
CRETE, NEBR. (9YU).—W. l., 150–220.
CULVER, IND. (9YQ).—W. l., 150–220.
DAVENPORT, IOWA (9XE).—W. l., up to 1000.
DAVENPORT, IOWA. (9YAP).—W. l., 150–220.
DEARBORN, MICH. (8XD).—W. l., 130, 273, 517, 1713.
EAGLE ROCK, CALIF. (6XAT).—W. l., 100–3000.
EAST CLEVELAND, OHIO (8YD).—W. l., 150–220.
EL MONTE, CALIF. (6XAX).—W. l., 375.
EUGENE, OREG. (7YB).—W. l., 150–220.
EVANSTON, ILL. (9YH).—W. l., 150–220.
FORT WORTH, TEX. (5YS).—W. l., 150–220.
GLENBROOK, CONN. (1XAK).—W. l., 100–6000.
GRAND COTEAU, LA. (5XZ).—W. l., 200–220.
GRANVILLE, OHIO (8YM).—W. l., 150–220.
GREAT NECK, N. Y. (2XAN).—W. l., 150–1000.
GREEN HARBOR, MASS. (1XD).—W. l., 300–2000.

GROVE CITY, PA. (8YV).—W. l., 150–220.
GUNNISON, COLO. (9YAH).—W. l., 150–220.
HAMILTON, OHIO (8XAG).—W. l., 200–375.
HOUSTON, TEX. (5XAC).—Call signal changed to 5 XBB; w. l., 200–585.
IOWA CITY, MO. (9YA).—W. l., 150–220.
ITHACA, N. Y. (8XU).—W. l., 200–2000.
LACEY, WASH. (7YS).—W. l., 150–220.
LE MARS, IOWA (9YAE).—W. l., 150–220.
LINCOLN, NEBR. (9YY).—W. l., 150–220.
LITTLE ROCK, ARK. (5XAB).—W. l., 200, 220.
LOS ANGELES, CALIF. (6XAH).—W. l., 100–600.
LOS ANGELES, CALIF. (6XAK).—W. l., 200, 375.
LOS ANGELES, CALIF. (6XBC).—W. l., up to 1000.
LOS ANGELES, CALIF. (6XL).—W. l., 150–220; station operated and controlled by General Petroleum Corp.
LOS ANGELES, CALIF. (6XT).—W. l., 200–675.
MINNEAPOLIS, MINN (9XI).—W. l., variable.
MINNEAPOLIS, MINN. (9YX).—W. l., 150–220.
MONTGOMERY, ALA. (5XR).—W. l., 200–1000.
NEW BRAUNFELS, TEX. (5YK).—W. l., 150–220.
NEW ORLEANS, LA. (5XH).—W. l., 200–3000.
NORTHVILLE, MICH. (8XL).—W. l., 130, 273, 517, 1713.
OAKLAND, CALIF. (6XAM).—W. l., 200–360.
OBERLIN, OHIO (8YAE).—W. l., 150–220.
OKLAHOMA, OKLA. (5XT).—W. l., 200–1000.
OMAHA, NEBR. (9YP).—W. l., 150–220.
PARKESBURG, PA. (3XW).—W. l., 375–2500.
POLYTECHNIC, MONT. (7YI).—W. l., 150–220.
PORT ARTHUR, TEX. (5XV).—W. l., 100, 150, 200.
PORTLAND, OREG. (7XI).—W. l., 100–2000.
PORTLAND, OREG. (7YG).—W. l., 150–220.
PORTLAND, OREG. (7YK).—W. l., 150–220.
PROVIDENCE, R. I. (1XX).—W. l., 180–600.
RAINBOW, MONT. (7XO).—W. l., 600–1600.
RAPID CITY, S. DAK. (9YW).—W. l., 150–220.
REDLANDS, CALIF. (6YC).—W. l., 150–220.
ROCKFORD, ILL. (9XF).—W. l., 300, 325.
RUSHVILLE, NEBR. (9YAT).—W. l., 150–220.
SAN DIEGO, CALIF. (portable) (6XN).—W. l., 200, 450.
SCHENECTADY, N. Y. (2XI).—W. l., 100–4500.
SCHENECTADY, N. Y. (2XQ).—W. l., 250, 360, 1500.
SEATTLE, WASH. (7XR).—W. l., 150–1500.
SEATTLE, WASH. (7XU).—W. l., 150–1500.
SEATTLE, WASH. (7XZ).—W. l., 200–1300.
SEATTLE, WASH. (7YM).—W. l., 150–220.
SOUTH PASADENA, CALIF. (6XAS).—Changed to Los Angeles, Calif.; w. l., 150–300.
SPOKANE, WASH. (7YL).—W. l., 150–220.
ST. LOUIS, MO. (9XR).—W. l., 150–1000.
ST. LOUIS, MO. (9YK).—W. l., 150–220.
THOMPSON FALLS, MONT. (7XN).—W. l., 600–1600.
TROY, N. Y. (2XAP).—W. l., 220.
UNDERWOOD, WASH., near (7XQ).—W. l., 400–2000.
VERMILION, S. DAK. (9YAM).—W. l., 150–220.
WAYNE, NEBR. (9YT).—W. l., 150–220; station operated and controlled by State Normal School and Teachers College.
WEST LAFAYETTE, IND. (9YB).—W. l., 150–220.
WINFIELD, N. Y. (2XP).—W. l., 150–250.
WORCESTER, MASS. (1XS).—W. l., 50–600.

Strike out all particulars of the following-named stations: Atlanta, Ga. (4YJ); Baltimore, Md. (3XAA); Baltimore, Md. (3XT); Columbus, Ohio (8XC); Keyport, N. J. (2XAS); Milwaukee, Wis. (9YAD); Pittsburgh, Pa. (8YI); Princeton, N. J. (3XU); San Francisco, Calif. (6XP); and Washington, D. C. (3XQ).

MISCELLANEOUS.

LICENSES OF AMATEUR OPERATORS SUSPENDED.

Recently the license of an amateur operator was suspended for a period of three months on account of the operator being examined within three months after a prior examination in which he failed to pass, which constituted a violation of regulation 133 of the Radio Communication Laws of the United States, which reads, in part, as follows: "No applicant who fails to qualify will be reexamined at any examining office within three months from date of the previous examination. * * * When the records of the bureau develop the fact that an applicant has failed to qualify and has applied for reexamination or been reexamined at the same or another office within three months, his existing license may be suspended or revoked by the Secretary of Commerce."

In another case an amateur operator had his operator's license and station license suspended for one year for violation of section 7 of the act of August 13, 1912, in that he transmitted a false distress signal (SOS).

ALASKAN STATIONS REOPENED FOR SUMMER SEASON.

Chignik (KHC), opened May 7; Chignik (KNP), opened May 3; Kvichak (KHB), opened May 24; Lazy Bay (KEPS) opened May 14; Naknek (KHT), opened May 21; Pilot Point (KUDT), opened May 23; Rose Inlet (KJC), opened May 8; Tee Harbor (KQP), opened May 14; Uyak (KHA), opened April 26; and Yes Bay (KRU), opened May 3.

INTRODUCTION OF SUMMER TIME IN GREAT BRITAIN AND IRELAND.

Notice has been received by this office that "summer time" which is one hour in advance of Greenwich mean time, will be kept in Great Britain (including the Channel Islands and the Isle of Man) and Ireland (Northern Island and the Irish Free State) until further notice. Normal time will be resumed at 0200 G. M. T. (civil) on September 16, next, unless otherwise changed.

INFORMATION FROM THE BERNE BUREAU.

Australia.—General call VZDW has been assigned to all vessels operated by the Amalgamated Wireless Co. (Ltd.), to be used by coast and ship stations desiring to ascertain whether there is a vessel of the same company within range in order that communication may be established with as little delay as possible.

France.—The coast station Rochefort-sur-Mer was opened on April 20, last, to general public correspondence.

Greece.—The coast station Kerkyra No. 3 is open to general public correspondence.

Belgium.—The legal time in this country was advanced one hour on April 22, last, until further notice.

British Indies.—The coast station at Victoria Point is not open continuously any longer. The new hours are from 0 to 02.30; 04.30 to 14.00; and from 16.00 to 24.00 G. M. T.

LAND-LINE TELEGRAPH RATES FOR TRAFFIC HANDLED BY WILMINGTON (CALIF.) (KSE) STATION OF THE RADIO CORPORATION OF AMERICA.

To—	Cents per word.	To—	Cents per word.
Alabama	11	Nevada	6
Alberta	11	New Brunswick	11
Arizona	6	Newfoundland	18
Arkansas	11	New Hampshire	11
British Columbia	7	New Jersey	11
California:		New Mexico	7
Los Angeles	3	New York	11
Other points	4	North Carolina	11
Colorado	9	North Dakota	9
Connecticut	11	Nova Scotia	11
Delaware	11	Ohio	11
District of Columbia	11	Oklahoma	9
Florida	11	Ontario	11
Georgia	11	Oregon	7
Idaho	9	Pennsylvania	11
Illinois	9	Prince Edward Island	15
Indiana	11	Quebec	11
Iowa	9	Rhode Island	11
Kansas	9	Saskatchewan	11
Kentucky	11	South Carolina	11
Louisiana	11	South Dakota	9
Maine	11	Tennessee	11
Manitoba	11	Texas	9
Maryland	11	Utah	7
Michigan	11	Vermont	11
Massachusetts	11	Virginia	11
Minnesota	11	Washington	7
Mississippi	11	West Virginia	11
Missouri	9	Wisconsin	11
Montana	9	Wyoming	9
Nebraska	9		

NOTE.—In addition to the above rates there is also the ship-to-shore rate, which is 10 cents per word, and the ship rate, which is usually 8 cents per word, except in certain instances, when the ship rate is 4 cents per word or some other rate.

TRANSOCEANIC RATES FOR TRAFFIC THROUGH STATIONS OF THE RADIO CORPORATION OF AMERICA.

Effective April 15 last, the following rates for points mentioned supersede those formerly in effect. For such traffic add ship and coast station tolls to those shown below:

To—	Through stations on Atlantic coast.	Through stations on Pacific coast.
	Cents per word.	*Cents per word.*
Alsace-Lorraine	22	34
England	20	34
France	22	34
Great Britain	20	34
Ireland	20	34
Scilly Island (Great Britain)	20	34
Scotland	20	34
Shetland Islands	20	34
Wales	20	34

RADIO FREQUENCY INDICATOR FOR BROADCASTING STATIONS.

At the Second National Radio Conference, held in Washington from March 20 to 24, 1923, it was resolved, among other things, "That every broadcasting station should be equipped with apparatus, such as a tuned circuit coupled to the antenna and containing an indicating instrument, or the equivalent, for the purpose of main-

taining the operating wave frequency within 2 kilocycles of the assigned wave frequency."

The Bureau of Standards has designed a preliminary model of a radio frequency indicator to meet the above need and has prepared specifications covering its construction. These specifications may be had by any broadcasting station upon request.

The instrument consists, essentially, of a 72-turn space-wound coil on a 3¼-inch tube, an air condenser, and a sensitive thermogalvanometer. These three elements are connected in series. The condenser is a variable condenser provided with a locking device, so that it may be locked and soldered in position after the instrument has been adjusted to indicate the required frequency. This instrument may be set to indicate any radio frequency in the range from 1,320 kilocycles (222 meters) to 550 kilocycles (545 meters). If an instrument is constructed according to the specifications and sent to the Bureau of Standards radio laboratory by a licensed broadcasting station, it will be adjusted, for a nominal fee, to operate at the frequency of the station.

AUDIO-FREQUENCY AMPLIFIER UNIT.

The Bureau of Standards frequently receives requests for information regarding simple apparatus for audio-frequency amplification from persons who wish to construct such apparatus. To meet these demands there has been prepared Bureau of Standards Circular No. 141, Description and Operation of an Audio-Frequency Amplifier Unit for Simple Radio Receiving Outfits.

Announcement has previously been made of the publication of Circular No. 120, Construction and Operation of a Simple Homemade Radio Receiving Outfit, and Circular No. 121, Construction of a Two-Circuit Radio Receiving Equipment with Crystal Detector, and Circular No. 133, Description and Operation of an Electron Tube Detector Unit for Simple Radio Receiving Outfits.

One or two of the audio-frequency amplifier units described in Circular No. 141 can be used in connection with the apparatus described in these earlier circulars or in connection with other similar receiving apparatus which may be available for the purpose of amplifying the received signal and thus increasing the effective range of the set and the volume of sound in the telephone receivers. The most important parts of the amplifier unit described are an electron tube and an audio-frequency transformer. The cost of this audio-frequency amplifier unit, including the cost of the tube, will probably be between $13 and $21. This does not include the cost of batteries which may be required in addition to those already available.

A list is given of the material necessary for constructing the amplifier unit and also a description of the method of wiring and assembling the unit. Illustrations are given showing the arrangement of the various parts, and there is a photograph of the complete assembled unit. An illustration is also given which shows two of these amplifier units connected to the two-circuit set described in Circular No. 121 and the electron tube detector unit described in Circular 133.

A list is given of the symbols used to represent the different pieces of apparatus and parts of circuits shown in the illustrations appearing in the circulars mentioned above.

A copy of Circular 141 may be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

TESTS OF RADIO RECEIVING SETS.

During the past two years the radio laboratory of the Bureau of Standards has been developing methods of testing radio receiving sets and has made tests on receiving sets of a number of different types. The results of the tests on these sets are given in a series of letter circulars which are in preparation. The first letter circular in this series is designated as Letter Circular 90 and has recently been issued. The sets on which tests are therein described are regenerative sets using electron-tube detectors and are of the type intended for such use as the reception of continuous wave signals from arc transmitting stations on wave frequencies down to 60 kilocycles (wave lengths up to 5,000 meters). The Bureau of Agricultural Economics, U. S. Department of Agriculture, on account of its interest in the reception of crop, market, and weather reports by radio, has assisted in this investigation. The particular receiving sets studied are referred to by arbitrary reference numbers rather than by a statement of the manufacturers' names and type or model numbers. It is believed that the methods followed and the examples given in this circular will be of assistance to manufacturers in the development of methods of testing and describing their own products and thus

improving them. It is believed that purchasers will also be directly aided in deciding what features and characteristics to look for in the selection of apparatus.

A limited number of mimeographed copies of Letter Circular 90 are available and can be secured by those who are directly concerned with the testing of receiving sets by addressing the Bureau of Standards, Department of Commerce, Washington, D. C.

SHORT RADIO WAVES TRANSMITTED IN BEAMLIKE SEARCHLIGHT REDUCE INTERFERENCE.

Up to a few years ago radio communication was for the most part carried on from transmitting station to one receiving station; this is "point-to-point" communication. There were only a few special kinds of services, such as time and weather signals, in which messages transmitted by radiotelegraph from one station were received by a considerable number of receiving stations. However, signals were transmitted from a transmitting station in every direction and could, if desired, be received by any receiving station located within a certain distance, regardless of its direction. A comparatively small number of wave frequencies was sufficient to take care of traffic requirements. Practically all radio communication in the past has been carried on on wave lengths above 200 meters.

With the development of radiotelephone transmitting apparatus, the transmission of the voice or music broadcast by radio has assumed an important place in the radio field. Radio waves which are transmitting the voice or music occupy a wider band of wave frequencies than a "sharp" wave transmitting radiotelegraph signals. Because of this great increase in a kind of service which requires a wide band of wave frequencies there is already considerable interference among broadcasting stations and between broadcasting stations and radiotelegraph stations. This problem received attention at the radio conference which met in Washington in March at the invitation of Secretary Hoover, and the possibilities of using short waves for reducing interference received attention. Telephony requires a band of wave frequencies of a certain width, and at high frequencies, such as those corresponding to wave lengths of about 10 meters, a considerable number of such frequency bands or channels are available.

For point-to-point communication two important ways of reducing such interference are to direct the waves radiated from the transmitting stations in a narrow beam toward the receiving station and to use short wave lengths which are not at present employed. Some English investigators have recently reported on the results of their investigations on directive short-wave transmission.

Experiments have recently been conducted at the Bureau of Standards on transmitting apparatus, employing electron tubes, which transmits a directed beam of radio waves and employs waves as short as 10 meters. This system, therefore, offers substantial relief from interference difficulties. It also has possible military applications. The apparatus has been used for communication by both radiotelegraphy and radiotelephony.

In the experiments at the Bureau of Standards a reflector has been used consisting of short parallel vertical wires arranged on a frame shaped like a parabola. This reflector acts much as an ordinary mirror would for light waves. The radio waves are, in fact, the same kind of waves as light waves but of considerably longer length. Forty vertical wires were used, and the generating set with its small antenna was placed at the focus of the parabola. Each wire was tuned separately to 10 meters by adjusting its length. It was found that about 75 per cent of the radiated energy could be confined within an angle of about 40°.

There has recently been issued Bureau of Standards Scientific Paper No. 469, Directive Radio Transmission on a Wave Length of 10 Meters, by F. W. Dunmore and F. H. Engel. This paper describes the experiments which the authors have conducted at the bureau and gives the constructional details of the apparatus used, so that any person interested can duplicate the apparatus and the results obtained and continue in this line of investigation.

A copy of Bureau of Standards Scientific Paper No. 469 may be purchased for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C.

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RADIO SIGNALS OF STANDARD FREQUENCY.

There is given below the schedule of standard frequency signals to be transmitted from the Bureau of Standards at Washington (station WWV). These signals should be of interest to all station operators who transmit on frequencies above 425 kilocycles, as they may be used for checking wave meters and adjusting transmitting and receiving apparatus. Their accuracy is better than three-tenths of 1 per cent. Information regarding the use of these signals was given in February (1923) issue of the Radio Service Bulletin. More detailed information is given in Bureau of Standards Letter Circular No. 92, which may be obtained on application to that bureau.

Commercial and ship stations should be especially interested in the 425, 500, and 600 kilocycle waves. The 425 kilocycles wave is the new frequency allocated by the Department of Commerce for commercial ship traffic; the remainder of the schedule includes the frequencies used by broadcasting and amateur stations. The transmission on the morning of October 7 is especially for amateur stations and includes only frequencies used by them. It will be helpful if amateur operators will stand by while the standard frequency signals are being transmitted on this date, so there will be as little interfenence as possible with their general reception.

In the schedule below the "general call" is given by voice during the first half of the four-minute period and by continous wave telegraph during the second half; this call is given to enable listeners to tune in WWV. The "standard frequency signals" consist of the call letters WWV (.– – .– – .– –) repeated with very long dashes intervening and are transmitted by unmodulated continuous waves. The "announcements" are made by voice during the first half of the period and by continuous wave telegraphy during the latter half. The general call and the announcements are made on the same frequency as the standard frequency signals and may be used for some measurement purposes, but it is recommended that accurate measurements be made on the standard frequency signals only. With sensitive receiving apparatus it should be possible to receive these signals anywhere east of the Mississippi River.

Schedule of standard frequency transmission from WWV.

Eastern standard time.	Signal.	Kilocycles (wave length in meters).				
		June 11.	July 17.	Aug. 15.	Sept. 13.	Sept. 28.
10.55 to 11.04 p. m.	General call	400 (750)	425 (705)	425 (705)	425 (705)	500 (600)
11.04 to 11.08 p. m.	Standard frequency					
11.08 to 11.11 p. m.	Announcements					
11.15 to 11.19 p. m.	General call	500 (600)	500 (600)	500 (600)	500 (600)	700 (428)
11.19 to 11.23 p. m.	Standard frequency					
11.23 to 11.26 p. m.	Announcements					
11.30 to 11.34 p. m.	General call	600 (500)	666 (450)	666 (450)	666 (450)	900 (333)
11.34 to 11.38 p. m.	Standard frequency					
11.38 to 11.41 p. m.	Announcements					
11.45 to 11.49 p. m.	General call	700 (428)	850 (352)	850 (352)	850 (352)	1100 (273)
11.49 to 11.53 p. m.	Standard frequency					
11.53 to 11.56 p. m.	Announcements					
12.00 to 12.04 a. m.	General call	800 (375)	1000 (300)	1000 (300)	1000 (300)	1300 (231)
12.04 to 12.08 a. m.	Standard frequency					
12.08 to 12.11 a. m.	Announcements					
12.15 to 12.19 a. m.	General call	900 (333)	1250 (240)	1250 (240)	1250 (240)	1500 (200)
12.19 to 12.23 a. m.	Standard frequency					
12.23 to 12.26 a. m.	Announcements					
12.30 to 12.34 a. m.	General call	1000 (300)	1500 (200)	1500 (200)	1500 (200)	1700 (176)
12.34 to 12.38 a. m.	Standard frequency					
12.38 to 12.41 a. m.	Announcements					

Schedule of standard frequency transmission from WWV—Continued.

Eastern standard time.	Signal.	Kilocycles (wave length in meters) Oct. 7.	Eastern standard time.	Signal.	Kilocycles (wave length in meters) Oct. 7.
1.55 to 2.04 a. m...	General call.....	1,859 (322)	3.00 to 3.04 a. m...	General call.....	1,800 (167)
2.04 to 2.08 a. m...	Standard frequency.		3.04 to 3.08 a. m...	Standard frequency.	
2.08 to 2.11 a. m...	Announcements.....		3.08 to 3.11 a. m...	Announcements.....	
2.15 to 2.19 a. m...	General call.....	1,500 (200)	3.15 to 3.19 a. m...	General call.....	1,900 (158)
2.19 to 2.23 a. m...	Standard frequency.		3.19 to 3.23 a. m...	Standard frequency.	
2.23 to 2.26 a. m...	Announcements.....		3.25 to 3.26 a. m...	Announcements.....	
2.30 to 2.34 a. m...	General call.....	1,600 (187)	3.30 to 3.34 a. m...	General call.....	2,000 (150)
2.34 to 2.38 a. m...	Standard frequency.		3.34 to 3.38 a. m...	Standard frequency.	
2.38 to 2.41 a. m...	Announcements.....		3.38 to 3.41 a. m...	Announcements.....	
2.45 to 2.49 a. m...	General call.....	1,700 (176)			
2.49 to 2.53 a. m...	Standard frequency.				
2.53 to 2.56 a. m...	Announcements.....				